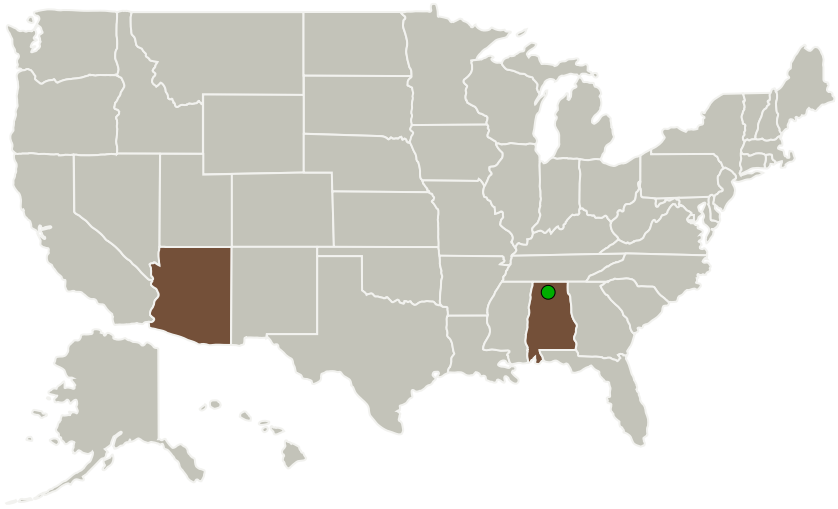
In-Situ Extended Lateral Range Surface Metrology, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

We propose to develop an extended lateral range capability for a dynamic optical profiling system to enable non-contact, surface roughness measurement of large and aspheric astronomical optics in-situ during manufacture. This instrument will be capable of measuring more than three decades of spatial frequency range for determination of rms surface roughness. It will be insensitive to vibration, being based upon our patented phase-sensor technology, and capable of being mounted on a computer-controlled polishing machine for in-situ measurement of large, aspheric and freeform optics. Objectives for Phase I are to demonstrate a novel automatic alignment system enabling in-situ extended lateral range surface profiling, demonstrate an extended lateral range concept, and to demonstrate a measurement range of more than three decades in spatial frequency. Anticipated results of Phase I will be documented laboratory demonstrations of these capabilities. Our TRL before Phase I is 2-3, after Phase I we anticipate a TRL of 3-4 and after Phase II a TRL of 6.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
4 D Technology Corporation	Lead Organization	Industry	Tucson, Arizona
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Arizona

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138637)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

4 D Technology Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

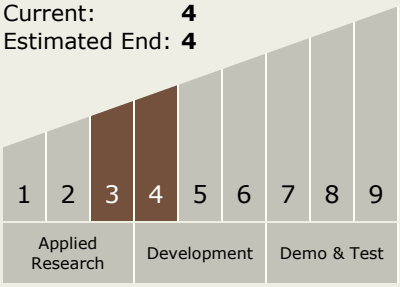
Carlos Torrez

Principal Investigator:

Katherine Creath

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.3 Distributed Aperture

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System